

HH506RA K, J, T, E, R, S, N Thermometer

INSTRUCTION SHEET
M4079/0704

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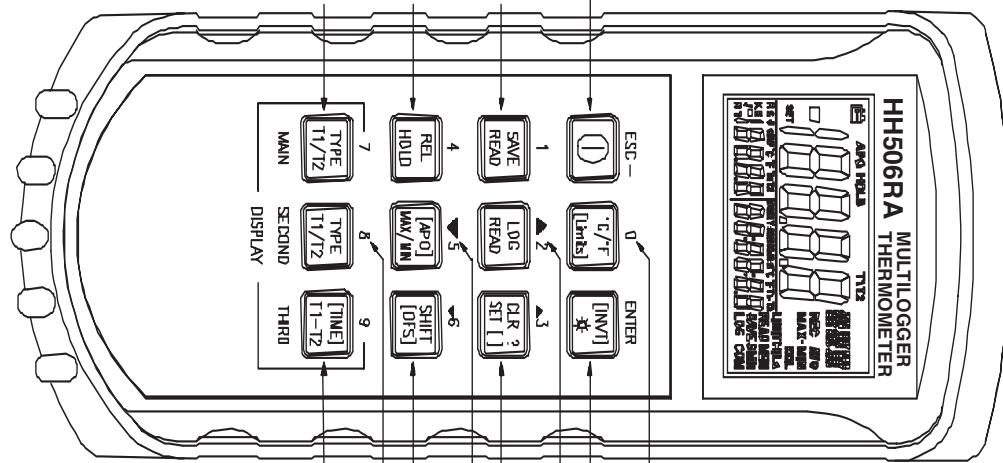
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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

INTRODUCTION

ENVIRONMENTAL

Ambient Operating Range:
0C to 50C (32F to 122F) <80% R.H.

Storage Temperature:
-20C to 60C (-4F to 140F) <70% R.H.

Input Connector:
Accepts standard miniature thermocouple connectors

(flat blades spaced 7.9 mm, center to center).
measures external thermocouples of type K, J, R, S, T, E, and N. The thermocouple types comply with the NIST-ITS 90 standard reference temperature/voltage tables. The thermometer features a dual thermocouple input, an adjustable T/C offset and an RS-232 interface for uploading data to a PC using optional software and cable.

SAFETY INFORMATION

ELECTRICAL

Temperature Scale: Celsius or Fahrenheit

Measurement Range:

K-TYPE (0.1) -200C to 1372C,

-328F to 2501F -210C to 1200C,

-346F to 2192F -200C to 400C,

-328F to 752F -210C to 1000C,

-346F to 1832F -58F to 2372F

T-TYPE (0.1) 0C to 1767C,

32F to 3212F -50C to 1300C,

R-TYPE (1) 0C to 1767C,

32F to 3212F 0C to 1767C,

S-TYPE (1) 32F to 3212F

N-TYPE (0.1) -58F to 2372F

*Based on the ITS-90 temperature standard.

According to temperature standard ITS-90.

KJ/TE-TYPE Accuracy:

(0.05% rdg + 0.3C) on -50C to 1370C (0.05% rdg + 0.7C) on -50C to -210C

(0.05% rdg + 0.6F) on -58F to 2501F (0.05% rdg + 1.4F) on -58F to -346F

(0.05% rdg + 0.8C) on -50C to 0C (0.05% rdg + 0.4C) on 0C to 1300C

(0.05% rdg + 1.6F) on -58F to 32F (0.05% rdg + 0.8F) on 32F to 2372F

(0.05% rdg + 0.3C) on 0C to 1767C (0.05% rdg + 2C) on 0C to 1767C

(0.05% rdg + 4F) on 32F to 3212F (0.05% rdg + 4F) on 32F to 3212F

SPECIFICATIONS

ELECTRICAL

Temperature Scale: Celsius or Fahrenheit

Measurement Range:

K-TYPE (0.1) -200C to 1372C,

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T-TYPE (0.1) 0C to 1767C,

32F to 3212F -50C to 1300C,

R-TYPE (1) 0C to 1767C,

32F to 3212F 0C to 1767C,

S-TYPE (1) 32F to 3212F

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(0.05% rdg + 0.8C) on -50C to 0C (0.05% rdg + 0.4C) on 0C to 1300C

(0.05% rdg + 1.6F) on -58F to 32F (0.05% rdg + 0.8F) on 32F to 2372F

(0.05% rdg + 0.3C) on 0C to 1767C (0.05% rdg + 2C) on 0C to 1767C

(0.05% rdg + 4F) on 32F to 3212F (0.05% rdg + 4F) on 32F to 3212F

GENERAL Displays:

The Main and Second display panels are 4 1/2 digit liquid crystal display (LCD) with maximum reading of 19999. These panels are used for displaying the value of T1 or T2.

The Third panel displays the date, time, or the difference value of T1 to T2. When the input measurement is overloaded, the following is displayed "—.—".

Battery:

Standard 9V battery (NEDA 1604, IEC 6F22 006P) Battery life is about 100 hours when used with a carbon zinc battery.

Dimensions:

192 mm (H) x 91 mm (W) x 52.5 mm (D)

Weight: 365 g

Supplied Wire:

4 feet Type "K" thermocouple beaded wire (teflon tape insulated). Maximum insulation temperature 260C (500F). Wire accuracy 2.2C or 0.75% of reading (whichever is greater) from 0C to 800C.

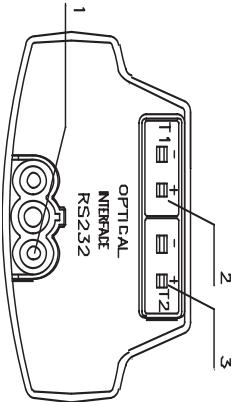
Temperature Coefficient:
0.1 times the applicable accuracy specification per C from 0C to 18 and 28C to 50C (32F to 64F and 82F to 122F)

Input Protection:
24V dc or 24V ac rms maximum input voltage on any combination of input pins.

Reading Rate: 2.5 time per second.

Top Side:

1. RS232 (Optical Interfaced) Port
2. Sockets of thermocouples T1
3. Sockets of thermocouples T2



OPERATING INSTRUCTIONS

Operational Mode

There are three operation modes—Normal, Shift, and Setup Mode.

Normal Mode:

This is the default mode; the operating functions for the normal mode are printed on the top of each button in white.

Shift Mode:

The operating functions for the shift mode are printed in yellow on the buttons. While in the normal mode, push the SHIFT button to switch to shift mode. At the lower-right hand corner of the display panel, the word “Shift” is displayed to indicate shift mode. To switch back to normal mode, press the SHIFT button.

(4) “SAVE/READ” button

The Read Data function works in conjunction with the Save function in the Shift mode; it is used for reading saved data. The Save function can be activated in Shift mode.

Press the SAVE/READ button to activate the Read Data function; the word “READ” should be displayed on the LCD. To navigate around the Saved Data table, press the overlay “SECOND” button until the “#” sign is displayed on the second display panel. The location of the read pointer within the Saved Data table will be displayed. The arrow buttons on the overlay are used for scrolling through the saved data. Pressing the smaller arrow “▲” or “▼” retrieves the next saved data. Pressing the larger arrow “▶” or “◀” will retrieve the next ten saved data. Pressing the overlay “ESC” button deactivates the read data function.

(5) “LOG/READ” button

The Log/Read function works in conjunction with the log function; it is used for reading the log data. The log function can be activated in the shift mode. Press the LOG/READ

button to activate the read log function; the word “READ”

should be displayed on the LCD. Press the overlay SECOND button to rotate through following display menus: T1, T2, GRP, and #.

Normal Mode:

The following functions can only be used in the normal mode.

(1) “Φ” Power Button

The “Φ” button turns the thermometer on or off. When entering data set mode, the power off function is disabled.

(2) “Limits” Button (only main display)

The limits function will alert the user when a measurement exceeds a specified limit. To set the limit values, refer to limits function in the setup mode.

SHIFT MODE

(7) HOLD mode (only main display)

When HOLD mode is selected, the thermometer holds the present readings and stops all further measurements. To activate the data hold mode, press the HOLD button, and “HOLD” is displayed on the LCD. Pressing the HOLD button again cancels the function, and the instrument will automatically resume measurements.

(8) MIN/MAX with time record mode (only main display)

The MIN/MAX function records the highest and lowest value recorded, and it calculates the average reading, and the differences of MAX to MIN. Press MIN/MAX button to enter the MIN/MAX recording mode. The beeper emits a tone when a new minimum or maximum measurement is

recorded. Press the MIN/MAX button again to rotate through the current readings:

MAX: The highest measurement recorded.

MIN: The lowest measurement recorded.

MAX-MIN: The difference of the highest and the lowest measurement.

Avg: The average values of the measurements. This mode works in conjunction with the hold function, pressing the HOLD button will stop the recording and measurements (Previously recorded readings are not erased). Press HOLD button again to resume recording and measurements. To prevent accidental loss of MIN, MAX and AVG data, the MIN/MAX function can only be canceled by pressing and holding down the MIN/MAX key for more than 2 seconds.

The Automatic Power Off function, and the power, CF, REL, SET, HI/LO Limits, TYPE, T1/T2 buttons are also disabled.

(5) “LOG” button

The data log function continuously records the data according to a specified time interval. The time interval can be set using the interval time setup function [INTV] in the setup mode. Press the LOG button to activate the log function; the indicator “LOG” and “MEM” will be displayed on the LCD. There are 16 groups that are used for storing the log data, and each group uses 64 data slots. If the current log session exceeds 64 data, the log function will automatically use the next group to store the following data. A maximum of 1024 data can be saved in one log session. Press the LOG button again to exit the data log function.

(6) “CLR?” button

The CLR function clears all the saved and logged data in memory. When the CLR button is pressed, indicator “MEM” is displayed and the “CLR” word on upper-right of LCD will blink. Pressing “ENTER” button printed on the overlay in white word to clear all saved and logged data or “ESC” button to exit this function.

(7) “REL?” button (only main display)

The relative value function can be used for comparing the saved reference value with other measurements. Press the “REL” button to store the current measurement as the reference value, and the “REL” should be displayed on the right part of the LCD. The next measurement will display the relative value compared to the reference value.

Press “REL” button again to clear the reference value and deactivate the relative value measurement function.

(8) “[APO]” button

Press the [APO] button to trigger “Auto power off” function on or off. In this function, the indicator “APO” is shown at the upper-left hand panel of the LCD. When APO (Auto power off) is enabled, it will automatically turn the thermometer off if the key switch is deactivated according to the set time (the default time for APO is 5 minutes).

Press the Power button to resume operation.

The following functions can only be used in the shift mode.

(2) “C/F” button

Press the C/F button to select the temperature scale. Readings can be displayed in Celsius (C) or Fahrenheit (F). When the thermometer is turned on, it is set to the temperature scale that was last in use.

(10) "TYPE" button (MAIN)

Press this button to change the type of thermocouple in the main display (K/J/T/E/R/S/N). If the inputs of the main and second displays are the same, then pressing this button will change the thermocouple type for both displays.

(11) "TYPE" button (SECOND)

Press this button to change the type of thermocouple in the second display (K/J/T/E/R/S/N). If the inputs of the main and second display are the same, then pressing this button will change the thermocouple type for both displays.

SETUP MODE

The following functions can only be used in the setup mode.

(2) "[Limits]" button (Hi/Lo limit setting) and Mini DIN output

Press the LIMITS button to enter the Hi/Lo Limit setup function, the "LIMIT", "HI", and main display will blink on the LCD, and the previous settings are displayed. Press the number button printed on the overlay in white to set Hi or Lo limit value, the resolution of Hi/Lo limit setup is 1 count. The button "—" (same button as the ESC) can be used to set negative values. Setting is from left to right digit. Press the "ENTER" button to confirm each setting.

3) "[INVT]" button (Interval time setting)

To setup the time interval for the log function, press the [INVT] button to set the time. The indicator "INV" will be blinking on the topright of the LCD and the previous settings will be displayed. Press the number button printed on the overlay in white to change the time interval. Setting is from left to right of the following format (HH:MM:SS). Press the overlay "ENTER" button to confirm. To exit this function, press the ESC button.

PROCEDURE OF CALIBRATION

1. Make ADJ pin short.
2. T2 input for a voltage of 70mV will show a value higher than 2800.2deg's at the third display and then press "set[]" key in the next step.
3. T1 input for a temperature of 0C will show a value 5C at the main display. Press "set[]" key to complete the calibration.
4. Take off the short pin.

WARNING
To avoid possible electrical shock, disconnect the thermocouple connectors from the thermometer before removing the cover.

Battery Replacement

Power is supplied by a 9 volt "transistor" battery. (NEDA 1604, IEC 6F22). The  appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery cover. Remove the battery from battery contacts.

(9) "[OFS]" button (Thermocouple offset adjust)

When the main display input is T1 and socket thermocouple is connected, the instrument can adjust the offset of the thermocouple or vice-versa for T2. In the setup mode, press this button to enter the thermocouple Offset Setup Function (OFS) and the indicator CAL should be displayed on the top righthand corner of the LCD while the main display blinks. While the previous setting is displayed, press the Number button printed on the overlay in white to change or set the offset of the thermocouple. The resolution of the setup is 0.1. Press the "—" button to set the negative value. Press the overlay "ENTER" button to confirm. MAX: 1999.9 C/F

(12) "[TIME]" button (System date and time setting)

To set or change the system time, press the [TIME] button in the setup mode. The time and date on the third display panel should blink. Enter from left to right in the following format: YY:MM:DD and HH:MM:SS. Press the Number button printed on the overlay in white word to set the system date and time. Press the "ENTER" word button to confirm. Exit this function by pressing the ESC button.

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OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year** product warranty to cover long and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is void if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion, or current, heat, moisture, or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and traces.

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The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:
1. Purchase Order number under PURCHASED,
which the product was
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:
1. Purchase Order number to cover the COST of the repair.
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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 pH, Conductivity & Dissolved Oxygen Instruments

 Environmental Monitoring & Control

 Air Quality Monitors

 Refractometers

 Pumps & Tubing

 Sensors

 Process Control

 Flow Meters

 Temperature

MIN: 000:00:01

(8) "[APO]" button (Auto power off/time setting, min. 5 minutes)
Use this function to change the time for the Auto Power Off (APO) function. Press the [APO] in setup mode, and the indicator "APO" and the main display will blink on the LCD, and the previous setting will be displayed. The default time for APO is 5 minutes. Press the Number button printed on the overlay in white to set the APO time. Press the overlay "ENTER" button to confirm. To exit this function without changing the setting, press the ESC button. MAX: 19999 minutes

printed on the overlay in white to set the APO time.

Press the overlay "ENTER" button to confirm. To exit this function without changing the setting, press the ESC button. MAX: 0005 minutes